REMARKS

Claims 1, 3, 4, 8, 13, and 15-17 have been amended for clarity and to address any potential subject matter rejections introduced by the recent decision in *In re Bilski*. Claims 28-34 have been added to claim the invention with more particularity. Support for new claims 28-34 may be found throughout the specification and particularly in paragraphs [0031]-[0033], [0037]-[0038], [0043], and [0045]. No new matter has been added. Upon entry of the above amendments, claims 1-34 will be pending.

Rejection Under 35 U.S.C. §103(a)

Claims 1-27 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable as obvious over US 2002/0147654 ("Kraisser") in view of US 5,983,198 ("Mowery"). This rejection is respectfully traversed.

Exemplary claim 1 has been amended to recite a scheduling and routing system for delivering a consumable to customers via commercial delivery vehicles comprising:

> a delivery forecasting system implemented on said processor that consumption matches certain customers to other customers with similar attributes and that forecasts from the delivery profiles of the other customers with similar attributes and/or historical profiles of deliveries to said certain customers when each said certain customer is anticipated to run out of inventory of the consumable; and
>
> an integrated inventory replenishment, scheduling and routing system implemented on said processor that generates a delivery route for a commercial delivery vehicle that prioritizes customers for delivery of said consumable based on risk of inventory depletion before delivery of more inventory of the consumable, said delivery route being generated based on (a) said forecasts and (b) variable parameters including road routing economics of making several deliveries in sequence to a plurality of said customers before replenishment of the commercial delivery vehicle.

Claim 3 is directed to a method of forecasting consumption and generating optimal delivery schedules for delivery of consumables to customers by commercial delivery vehicles, while claim 8 relates to a corresponding program storage device. Claims 13, 15, and 17 are similar to claims 1, 3, and 8, respectively, except that claims 13, 15, and 17 are directed to a system, method, and a corresponding program storage device for providing "periodically scheduled services" instead of delivering a "consumable" to customers. The teachings of Kraisser and Mowery are not particularly relevant to the systems, methods, and program storage devices as now claimed. The rejection over Kraisser and Mowery is traversed.

Kraisser

As previously noted, the claimed systems, methods and program storage devices have a totally different purpose and operation than the systems, methods and program storage devices disclosed by Kraisser. For example, the claims are directed to a scheduling and routing system and method for deliveries of propane and other consumables for which the customer's inventory is periodically depleted and/or for deliveries of periodic services via trucks with finite capacity. In accordance with a first claimed feature, certain customers are consumption matched to other customers with similar attributes and the profiles of the customers with similar attributes and/or historical profiles (if available) of deliveries to the certain customers are used to forecast when the certain customers are anticipated to run out of inventory of the consumable or when periodically scheduled services are anticipated to be needed. In accordance with a second claimed feature, the specific road routing economics are combined with the forecasts to generate a delivery route for delivering propane and other consumables and/or periodic services. As now claimed, the generated delivery route "prioritizes customers for delivery of said consumable based on risk of inventory depletion before delivery of more inventory of the consumable" or "based on risk of needing the services before delivery of the periodically scheduled services." The result to the user is a delivery system that provides the consumable and/or periodic services in a highly efficient manner without running out of the consumable on the delivery route or missing periodic services.

In contrast with the claimed systems, methods, and program storage devices, Kraisser seeks to provide a delivery scheduling system that only schedules deliveries within a particular time window if: (1) it is possible to make all scheduled deliveries within the time window; and (2) it makes business sense to make each delivery within the time window (Paragraph [0012]). This objective is accomplished by providing a system and method for: (1) identifying a time window in which a requested delivery may be made to a customer; (2) determining a cost of delivery that includes the cost of making the requested delivery to the customer within the time window; (3) comparing the cost of delivery with a threshold cost; and (4) responsive to the cost of delivery being less than the threshold cost, indicating that the time window is available for the delivery.

Although both systems deal with scheduling, the similarities end there. The claimed systems, methods and program storage devices take into account the customer's forecasted inventory when scheduling deliveries. The customer's inventory is not taken into account by Kraisser. Kraisser is instead concerned with delivering the customer's product within a particular time window. To put it another way, the claims provide techniques for scheduling periodic services and periodic deliveries of products (such as propane) that are consumed by the customers at some rate and the product must be replenished before the product is used up. By contrast, Kraisser's technique is more akin to a customer scheduling the delivery of a purchased appliance or cable repair services during a particular time window. These are different issues with different design solutions. For example, such systems differ with respect to their handling of the demand, the objective of their routing optimization, and their use of priorities. The claim amendments account for these differences by forecasting when each customer is anticipated to run out of inventory and generating a delivery route that prioritizes customers for delivery of the consumable based on risk of inventory depletion before delivery of more inventory of the consumable.

Handling of the demand

Kraisser's system is designed to accept the delivery demand specified by a customer. This demand could be specified by the customers themselves (as in the example provided) or through an order entry clerk. In contrast, the claimed systems, methods, and program storage devices determine the customer needs predicated on forecasts of when the customer is anticipated to run out of inventory based on, for example, historical delivery profiles to the customer and/or the delivery profiles of other customers with similar attributes that have been consumption matched to the customer. Given that the customer specifies the delivery time window totally independent of customer inventory considerations, Kraisser clearly does not disclose "a delivery forecasting system" as claimed.

Also, Kraisser processes each customer demand when it is received and determines their schedule assignment only predicated on the current fixed status of the schedule because all previously scheduled deliveries have been committed to customers and therefore cannot be changed. In contrast, the claimed systems, methods, and program storage devices use delivery forecasting to generate a delivery route that prioritizes customers based on risk of inventory depletion before delivery of more inventory of the consumable. This difference provides opportunities for optimization that is not available to Kraisser.

Objective of routing optimization

Kraisser sequentially commits deliveries to customers in a particular time window on a First Come First Serve basis, thereby assuring non-optimality. The schedule driver is that the customer's delivery is in a particular time window. In contrast, the claimed systems, methods, and program storage devices use the delivery forecasting system to consider estimated demand of many customers when generating the delivery schedule, thereby allowing an optimal routing choice for the deliveries.

In addition, Kraisser only assures feasibility of the delivery schedule. In this regard, Kraisser's use of routing is only helpful in evaluating the cost of delivery with more accuracy and in maximizing the use of each particular time window across available vehicles. Importantly, Kraisser does not determine an optimal route except within a particular time window and only then through use of a "commercially available routing and scheduling program." (Paragraph [0112]). Thus, even Kraisser acknowledges that his system is not a delivery scheduling system but that a "commercially available" delivery scheduling system may be used with his system as desired. In contrast, the claimed systems, methods, and program storage devices assure both optimality and feasibility by integrating the inventory replenishment and delivery scheduling taking into account the status of the inventory and the road routing economics of making several deliveries in sequence. The claimed technique allows assignment to a (any) route - not assignment to a particular time window on a route.

Use of priorities

Kraisser determines priority on the basis of an arbitrary "business sense" relating the cost of making the delivery to the value of the merchandise being delivered. In contrast, the claimed systems, methods, and program storage devices determine priority based on the calculated risk that the customer's inventory will be depleted before the next delivery is made.

Applicant also notes that the priorities defined in Kraisser are static (*i.e.*, a customer will have the same priority regardless of the day of their order). In contrast, the priority scheme of the claimed systems, methods, and program storage devices is dynamic in that a customer with low priority will assume a higher priority later as the customer's inventory is being depleted. Kraisser does not give any provision for later scheduling of customers that cannot be currently served or in varying priority of the customer based on the need to replenish the customer's inventory of the consumable before the consumable is depleted.

In summary, Kraisser addresses a completely different delivery problem using a completely different implementation that does not take into account the customer's delivery profile for replenishment of inventory of the consumable or the provision of periodic services or schedule delivery taking into account the forecasted need for the services as well as other variables including road routing economics.

Mowery

In the Official Action, the examiner acknowledged that Kraisser does not forecast delivery based on risk of inventory depletion of certain customers as claimed. However, the examiner now cites the teachings of Mowery for such a feature. Applicant submits that Mowery does not teach this feature and that, even if combined with the teachings of Kraisser that the claimed invention would not have resulted.

As previously noted, Mowery predicts "expected usage and required delivery date based on the unique usage patterns of each particular site" (Column 4, lines 33-37). Such historical data is available in the Mowery system on a daily basis (Column 4, lines 40-44). Mowery does not teach what to do when such data is sparse or not available, as in the case of propane delivery which is typically delivered only a few times a year. In particular, Mowery does not teach consumption matching certain customers to other customers with similar attributes as claimed. In addition, Mowery also does not teach forecasting "from the delivery profiles of the other customers with similar attributes and/or historical profiles of deliveries to said certain customers when each said certain customer is anticipated to run out of inventory of the consumable" as claimed. Instead, Mowery uses a truck route memory 214 that stores information indicating the various possible routes for each of the vehicles to the tanks of customers that are part of the system. The projected usage stored in memory 210 is used in combination with truck routes stored in memory 214 to provide dispatching information for minimizing total delivery costs (Column 7, lines 13-22).

In contrast, the claimed methods and apparatus constructs new optimal routes (not predetermined routes) over several days and optimize routes for a set of known delivery quantities so as to prioritize customers "based on risk of inventory depletion before delivery of more inventory of the consumable" as opposed to optimizing based on a known set of routes as in Mowery. For the optimization provided in the claimed methods, Mowery would require generation of all candidate routes beforehand which is numerically prohibitive for even very modestly sized applications. Accordingly, even if one skilled in the art would have combined the teachings of Mowery with the teachings of Kraisser as the examiner alleges, the claimed invention would not have resulted. Withdrawal of the rejection of claims 1-27 as obvious over Kraisser and Mowery is thus believed to be proper and is respectfully solicited.

New claims 28-34

New claims 28-34 add particular features of an exemplary embodiment that are nowhere shown or suggested by Kraisser or Mowery. Claims 28-34 are believed to be allowable by virtue of their dependencies from claim 1 but are believed to be further non-obvious in view of the additional claimed features that are not disclosed by Kraisser or Mowery.

Rebuttal to Examiner's Arguments

On page 6 of the Official Action, the examiner made three points that Applicant would like to address in this response.

First, the examiner alleged that there is "no recitation in the claims regarding a minimum or maximum frequency of data on [a] customer's inventory of gas." Applicant agrees. The claims instead recite that consumption forecasts are based on "historical profiles of deliveries to said certain customers" when such data is available and/or "forecasts from the delivery profiles of the other customers with similar attributes" as when historical data for the customer is not available. As a result, the system is not reliant upon measuring the customer's inventory of gas and thus there is no reliance upon the frequency of such a measurement. The forecasts determine when the customer is anticipated to run out of inventory of the consumable. In the claimed system, the actual amount of inventory used to fill the tank is only learned after a delivery is made.

Second, the examiner alleged that forecasting is based on individual customer historical profiles (i.e. usage) and risk of inventory depletion." As just noted, this is true if such historical profiles for the customer are available. If such historical profiles are not available, the delivery profiles of the other customers with similar attributes are used.

Third, the examiner alleged that there is no support in the specification for "delivery profiles for similarly situated customers." In response, the claims have been amended to more closely track the language used in the specification. For example, the claims now recite consumption matching "certain customers to other customers with similar attributes" (claim 1). This feature is described with respect to steps 808 and 810 of Figure 6 at paragraphs [0055], [0060], and [0061], for example.

If the examiner believes that any of the revised claim language is not supported or should not be given weight for any reason, he is strongly encouraged to contact Applicant's undersigned representative to discuss claim amendments to provide explicit specification support or to obviate the examiner's claim interpretation.

Conclusion

For at least the reasons noted above, the amended claims are believed to be allowable over Kraisser and Mowery, and withdrawal of the rejection of claims 1-27 over Kraisser and Mowery is solicited. Newly added claims 28-34 are believed to be allowable for at least the same reasons as independent claim 1 from which these claims respectively depend.

For the reasons set forth in detail above, Kraisser and Mowery do not teach the claimed systems, methods, and program storage devices. Withdrawal of the rejection of claims 1-27 in view of the teachings of Kraisser and Mowery and allowance of claims 1-34 are respectfully solicited.

The present response is believed to obviate the prior art rejection of record. Entry of the above amendments and issuance of a Notice of Allowability are respectfully requested.

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/Michael P. Dunnam/
Michael P. Dunnam
Registration No. 32,611

Woodcock Washburn LLP
Cira Centre
2929 Arch Street, 12th Floor
Philadelphia, PA 19104-2891

Telephone: (215) 568-3100
Facsimile: (215) 568-3439